

# AVIATION

*The Oldest American Aeronautical Magazine*

NOVEMBER 3, 1928

Issued Weekly

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A "Whirlwind" powered Waco going into a climbing turn.

VOLUME  
XXV

## *Special Features*

The "Golden Eagle"

Airplane Engine Ignition

Wanted: Suitable 1929 Air Tour Formula

NUMBER  
19

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The Oldest American Aeronautical Magazine

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## There Are Others

A YOUNG lady was recently grounded for 15 days as the result of a self-conducted aerial trip under the low bridges that span the East River in New York City. To the best of our knowledge this is the first time that a member of the fair sex has been cited of the Aero Section Branch of the Department of Commerce, and it is to be hoped that other young ladies, who are engaged in flying for pleasure alone, will take heed and pilot their planes accordingly. While the young lady's flight required no great amount of daring and even less piloting skill, and was made successfully, there was the chance that it might have ended in a serious accident which would have affected persons not connected with the flight.

Planes of today are divided into two classes—one, those that fly for pleasure and those that fly for a living. The majority of those that fly for a living are the ones who have worked hard and sacrificed much that aviation might progress to the point where it received the recognition of the world at large and took its place among other industries. The results of these combined efforts are now history, and the going is a bit easier than it was in the days gone by. However, the public is not as yet completely sold on the airplane, and this is yet less completely explained to the fact that there are two distinct types of flying—one, safe and sensible, the other, an accident, no matter how it caused, has its effect upon the public as regards the safety of aviation as a whole. Those who fly for pleasure alone, both men and women, should be made to realize that there are other planes who depend upon aviation for a living, and that reckless, foolish, and selfish stunts they take just that much more difficult.

## Pilots for Private Owners

IN the early days of automobilizing there were proportionally to the number of cars in use a much larger percentage of chauffeurs than there are today. The reason was that cars were more difficult to drive, that they required much more care, that it was much harder to get supplies and gasoline, and also, that road trips had to be carefully staged, as the system of maining roads had not been developed. Today, nearly the same condition exists in regard to a private plane owner employing a professional pilot, even though he, himself, knows how to fly. Plans today are easier to fly than they were a few years ago, but there is still much progress to be made. Engines may be run for longer periods between overhauls, but if forced landings are to be avoided, the same condition of the engine must be carefully attended to. There is a constantly growing number of flying fields with proper facilities for servicing and storage, but as are long distance cross-country trips, there will be times when it will be difficult to obtain the proper gasoline and places where planes will have to be tethered down for the night instead of

being run into a hangar. Then there is the question of finding one's way. This not only requires considerable experience, but also requires a very considerable amount of advance study of maps, and the plotting of the course, the making of diagrams, convenient land marks, getting advance weather reports, etc.

All these things can be done by the private plane owner, if he has had enough experience, and especially if he is willing to take the time and trouble. However, if cross-country flying is to be done as it should be done, but often is not done, most by professional pilots, so much time will be spent in advance preparation as in the actual flying. If a private owner is to get the full benefit of his plane on a business trip, he will do so by employing a private pilot. That will not only relieve him from worry, but in case of bad weather, which prohibits flying, he can go on by train and have the pilot follow when the weather clears. The question of cost is, of course, a serious element, but many private pilots who fly their own planes locally will find it well worth while to employ the services of a competent pilot if they expect to take a long cross-country trip. Many private owners fly mostly for sport, but after all, the airplane will be used as in the automobile. For convenience and business, and in this respect the employment of a pilot helps greatly and there should be no excuse of false shame about employing one. A professional employs a professional captain when he goes on a long cruise, and other all cross-country flying requires as much experience.

## Air Cooled Racers

LAST year at the Spokane race, the air cooled radial engine was a serious contender in a military speed race. Last year, also, one of the Hirth Schneider Cap racers was fitted with an air cooled radial engine. This year at Los Angeles, the Boeing P-8B equipped with a Pratt and Whitney "Wasp" made the best time around the course. Though the speed was not quite as high as that made by the Curtiss V-12 at Spokane last year, it was still the victor. However, the "Wasp" has high power as that of the V-12. Of course, exact comparisons between the speed of planes powered with water and air cooled engines are not possible, as the air cooled engine plane requires a different type of fuselage than the water cooled. It also must be admitted, that even effort has been put into the development of air cooled engines during recent years than has been put into the water cooled. However, it has been proved very definitely that the air cooled radial can be a much more serious contender against the water cooled engine in pure speed contests than would seem possible by a glance of their relative round areas. Much has been learned during the past few years about the streamlining of radials and about the shape of fuselage which gives the best results for high speeds. It can no longer be said, as it could a few years ago, that water cooled engines must be used for high speed.

# Wanted:—Suitable 1929 Air Tour Formula

By JOHN T. NEVILLE

**W**ANTED—SUITABLE formula for scoring aeronautical airplanes entered in the 1929 National Air Tour?

That small order is the standing plea of the Detroit Board of Commerce, which organization has been staging the National Air Tour for the past four years.

As can be seen by the emphasis, the "wish" is the plea lies in the word "suitable," the idea being to acquire a formula that will satisfy both the manufacturers and pilots of each and every class of craft entered.

The difficulty confronting the Board's advisory committee is the selection of such a formula is obvious after glancing through the pages of *Aircraft*, or most any other authority concerned aeronautical trade publication. Who can advance a formula by means of which the performance of all of America's widely varied commercial airplane types can be compared with equal fairness to each of them? What engineer, or group of engineers, will suggest a formula to judge fairly the performance of low-powered and high-powered, single, dual, and tri-motored planes, monoplanes, biplanes, and triplanes, single seaters and transports, open and closed types, water-cooled and air-cooled engines, all entered in the same contest and vying for the same prize?

Pilots Hold Hearing After Tour

One of the highly interesting aspects to every year's National Air Tour is the meeting of the pilots who participated in the event. This meeting functions as a clearing house for ideas and complaints, both constructive and destructive, relating to the Tour, its management and operation. The meeting usually culminates with the filing of a petition signed by a majority of the pilots, or all of them, pointing out the faults, suggesting this or that, and pointing wherever and whatever, in their opinion, deserves praise.

The scoring formula, being the most important item considered in conducting the Tour never fails to come in for a generous share of criticism. Although it has been modified several times to conform with some of the suggestions made from time to time it has never met with the unanimous approval of the pilots. And, in that connection, it can logically be predicted, it probably never will meet with their unanimous approval so matter what engineering genius comes forward with an all-encompassing formula.

The impossibility of every standing petition is one formula to cover comparisons of so many varied classes of aircraft is realized by the aircraft events committee of the Detroit Board of Commerce. In the words of Wilbur H. Mayo, chief engineer of the Ford Motor Co. and chairman of that committee, the committee would

be seeking a formula that would fairly fill all the needs for which it is intended." Mr. Mayo, who presided at the pilots' meeting following the recent National Air Tour, made that statement during discussion of the Tour formula.

Mr. Mayo also reiterated the oft-repeated expression of the aircraft events committee that the committee is extremely desirous of cooperating with the manufacturers.



The 1929 Tour planes on Coney Island, Long Island, N. Y. The Tour was won by "Edgar" Robinson in a Stinson-Douglas monoplane.

and the pilots; it always fails to receive constructive suggestions, and it is always ready to substitute a favored formula when that formula has the slightest chance of proving better than the one in force.

The present formula, i. e., that used on the 1928 Tour, is as follows: Land speed, divided by stall speed, which, times 20 over the engine displacement equals the score for a leg. As has always been the case, the land, speed, stall and engine test were made at Ford Airport before the Tour began. Figures obtained in the tests were never changed, but rather the formula was applied to the individual planes, and considering the mileage and time element over individual legs, a "perfect score for a leg" or a "figure of merit" was assigned for each aircraft.

It can readily be seen then, how important is the winning or losing of the Tour are the pre-Tour tests. This

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fact gave rise to the complaint of the pilots that the Tour "is a cut and dried affair and leaving major accidents to wear or loss at Ford Airport before the Tour ever begins."

That particular criticism was seriously based. On the recent Tour the highest figure of 21000 was 800-4, that of "Johnny" Wood, pilot of a Waco Ten, who won the Tour. The loss was that of Don Robertson, pilot of the Curtiss Robin. Robertson's perfect score for a leg was 2527.

In order to show, further, the importance of the figure of merit determined at the pre-Tour tests, we print the following table, showing the order of finish, the plane, the figure of merit and the position of the figure of merit according to size. Nearly the first criterion is compared with the last. You will note that only one of the 21 aircraft finished in any position other than that which their respective figure of merit alone, would give them.

The table follows:

Place	Plane and No.	Figure of Merit	Pos. at 1 of 11
First	Waco No. 18	8304	First
Second	Ford No. 2	2984	Second
Third	Stinson No. 21	2526	Third
Fourth	Waco No. 9	2184	Fourth
Fifth	Stinson No. 20	2071	Fifth
Sixth	Dean No. 22	1981	Sixth
Seventh	Dean No. 18	1848	Seventh
Eighth	Belmont No. 1	1674	Eighth
Ninth	Dean No. 26	1624	Ninth
Tenth	Ford No. 8	1504	Tenth
Eleventh	Lockwood No. 31	1457	Eleventh
Twelfth	Waco No. 24	1416	Twelfth
Thirteenth	Travel No. 5	1311	Thirteenth
Fourteenth	Belmont No. 25	1402	Fourteenth
Fifteenth	Stinson No. 17	1401	Fifteenth
Sixteenth	Robt No. 2	1419	Sixteenth
Seventeenth	Stinson No. 6	1363	Seventeenth
Eighteenth	High Rock No. 11	1309	Eighteenth
Nineteenth	Stinson No. 29	1293	Nineteenth
Twentieth	Waco No. 9	1293	Twentieth
Twenty-first	Waco No. 27	1293	Twenty-first
Twenty-second	Travel No. 14	1206	Twenty-second
Twenty-third	Curtiss Robin No. 5	1206	Twenty-third
Twenty-fourth	Stinson No. 28	1206	Twenty-fourth

You will note that only the top 10 figure of merit points between numbers 16 and 20 all of the positions in the figure of merit standing are just one notch above what they actually would be had not the Tour occurred. In each case where a ship with a lower figure of merit slipped ahead of one with a higher one, the change was due to the pilot with the higher figure suffering more than his share of trouble as compared with very little trouble suffered by the lower figured pilot. Plane number 25 with a figure of merit of 1402, is seventh place in the Square of merit column seen into sixth place in the leg because Plane number 10, holder of sixth place in the figure of merit column suffered less important loss as against one in Plane number 25. Plane number 24 moved ahead of Plane number 26 because the former was lost but three times as compared with six times by

the latter. Plane number 37 went ahead of Plane number 2 because Plane number 2 had 6 important losses against one by Plane number 37. Two planes, numbers 9 and 24, moved ahead of Plane number 14 only because Plane number 14 had more trouble in El Paso than kept in behind the Tour for 13 days.

Therefore assuming that all of the winners would have scored perfect scores if around the route they



The 1929 Tour plane in Chicago. The Tour was won by Wilbur H. Mayo in a Ford biplane.

would have been lined up at the finish exactly according to size of their figure of merit, with the difference between any one ship and its immediate neighbor the difference between their respective figures of merit multiplied by 32, the number of legs on the Tour route. Only one ship, in fact, the Stinson, did finish with a perfect score, and that ship came in seventeenth because 15 other planes had figures of merit higher than it had.

Clearly, there is something wrong with a formula that operates like that. The pilots, as you like the Tour are not alone in agreeing with that point. The Aircraft Events Committee of the Detroit Board of Commerce, realizes it, and has tried for years to remedy it. But, who can advance a better one?

With regard to the Tour formula and the Board and Regulations governing the Tour, Ray Cooper, manager of annual events for the Board, had this to say:

Last year when we were attending the international congress in Washington we called a meeting of manufacturers with a particular view toward having them cooperate with us in drafting the rules and regulations for the next National Air Tour. An advisory committee was

(Continued on page 1444)



A line-up of the entrants in the first Ford-Wilbur H. Mayo Tour held in 1925

# The "Golden Eagle"

New Two Passenger Light Monoplane of the Externally Braced High Wing Type Has a Top Speed of 110 M.P.H.

By CHARLES E. McREYNOLDS

NOW in quantity production, following successful showing of two models in the Los Angeles International Exposition, the "Golden Eagle," externally braced, high wing, two place, monoplane, manufactured by the R. O. Rose Co., Los Angeles, Calif., promises to make a determined bid for popularity as the leading American lightplane.

Although the two models on exhibition at the recent air show were both single place, Anasui powered planes, the standard production job is to be a two place, dual control training and open plane equipped with the Aule 45 hp. engine. There are five of this new two seat model in production at the factory, in addition to the two original experimental models which are being test flown at the Foster Aircraft field south of Los Angeles. The first five airplanes are now in the assembly stage; material for a second lot of ten airplanes has been received and it is thought that the factory will be building 20 airplanes a month at a very short time. This production can be increased to five planes a day in the present plant if the demand should warrant such output.

## Application for Type Certificate Made

Application is now being made for the Department of Commerce Approved Type Certificate, and until this has been granted no distributors or dealers will be signed. In the meantime it is planned to send out the first five two seat planes to prospective distributors in a widely scattered part of the country, under experimental license, in order that they may be thoroughly demonstrated without delay. It is planned to make these demonstration flights low in order to show the value of the 10 p.m. safety factor of the Golden Eagle. The climb of better than 800 ft. per min., top speed of at least 110 m.p.h. and landing speed of under 30 m.p.h. should make these various demonstrations most interesting to those in the market for a light aircraft. The fact that the plane will fly hands off the controls, bank right and left with rudder only, and will remain in normal flying position, without swerving from a right or left control bank will help to make the demonstration worth while. Much of the Golden Eagle's maneuverability is the result of extra large control surfaces. The horizontal stabilizer and elevator each have an area of 10 sq. ft., giving a total horizontal control surface of 20 sq. ft. at the tail.

Attractive color combinations will feature the Golden Eagle planes and make them easy for the average person to distinguish and recognize. The wing is to be finished in silver, the nose wheel strut and cockpit cowlings in bright orange, and the fuselage orange and yellow with black striping to accentuate the streamlines. The tail will be silver with a Golden Eagle insignia on each side of the saddle. Inside the cockpit all controls will be nickel plated and the entire cockpit, including the Consolidated instrument board panel, is to be upholstered in black leather.

Although these colors are standard, the customer may order any desired combination of Berry Bros. lamping colors without additional cost. Cowlings the engine and fitting a spinner to the propeller will also help to accentuate the clean lines of the plane.

The Golden Eagle is a light, two place, externally braced, high wing monoplane weighing approximately 250 lb. empty. Dual controls are standard equipment with the passenger cockpit in front.

The high wing is of semi-cantilever type braced both externally and internally. Front and rear spars are of straight braced steel pipe, airplane space with diagonal



Flight picture of the "Golden Eagle" monoplane shown at Richard by R. O. Rose Co., Los Angeles, Calif.

spacers, coming between the upper stream bracing. The front spar measures 7 in. deep by 3/4 in. thick. Rear spar is 2 1/2 in. deep and 1 in. thick. The wing is braced to the body by four short center section struts to the upper longerons and by two long struts on each side of the fuselage extending from the lower longerons out to the wing beams. All struts are streamlined with light wood, winged and dished, and each pair of struts is cross braced with an ambone wire. The long struts are adjustable at the wing beam fitting to provide for rigging. All wing fastenings are of heavy steel covered completely around the beam with the minimum of bolts passing through the spar.

There are eight compression members 3/4 in. by 2 in. spaced between spars independently of the ribs. Drag bracing is by 10 gauge round wire, double on the center three ribs and single wire in the outer two on each side. The wing cover is a modified Clark Y. By slightly flattening the curve, Mr. Campbell, the designer, has been

able to improve the take off and landing qualities of the Golden Eagle without sacrificing speed. The wing is straight across without taper and has an aspect ratio of six plus. Wing tips are of 3/5 in. diameter and measure 10 in. having a 4 1/2 in. curve and with the upper and lower surfaces equally tapered. Wing span is 28 ft. and chord is 4 ft. 6 in.

The wing ribs are of modified Warren truss structure built up of 3/8 in. airplane spruce, painted and glued on both sides, and fastened together with concentric brass



The "Golden Eagle" monoplane bottom view

with. All ribs are assembled in cast iron jigs, ensuring perfect accuracy and making it possible to build them rapidly.

In assembling the wing the ribs are slipped over the spars and are glued and nailed down to them. A 3/4 in. fillet runs along the tops of the spars to guarantee proper spacing and to provide a point of attachment for the plywood covering on the leading edge. The leading edge consists of a solid spar member shaped in the true air foil curve. This is covered with Haskite two ply to back slightly beyond the rear edge of the front spar. A fillet is also applied between ribs along the leading edge. The trailing edge is a 20 gauge L-shaped aluminum strip 1/8 in. wide which slips over the trailing ends of the ribs and is nailed to them. Wing covering is Flightex, fastened with Berry Bros. No. 1 clip.

The aloues are of wood construction similar to that of the wings and have a total area of 14 sq. ft. They are

each hinged to a false spar at three points along the upper edge of the aloues. The false spar is reinforced to the rear spar by an eight in. strip of plywood above and below each point of hinge attachment. Aloues are operated by flexible wires over pulleys.

The fuselage is of No. 35-380-1 A steel tubing formed and welded in a permanent jig to a rigid Warren truss structure. No inner wires are used. All welding is oxy-acetylene. Tubing is painted inside and outside and covered with red mastic and Berry Bros. gray enamel. No rivets are used anywhere in the entire airplane. The main longerons are 3/4 in. 20 gauge tubing. The front three forward stations are of 1/2 in. 20 gauge tubing also, and from there to the tail joint the cross members reduce in size from 3/8 in. to 3/16 in.

## False Spar, False Rib, Spring Straps

The turtle back, from joint to cockpit to the tail is formed with spring straps over plywood bulkheads. Spring strap wiring is also used along the rear point of each side and around the cockpit to provide a base of attachment for the aluminum covering. The entire fuselage is then covered with Flightex fabric except where streamlining is used around the cockpit.

The tail surfaces are of solid chrome molybdenum steel using fabric covered. Horizontal stabilizer is adjustable three and one-half degrees on the ground and is set at zero for a 150 ft. pitch. It is of one piece construction and is braced to the fuselage by streamlining wires at the rear edge, while streamlining struts leave the leading edge to the lower fuselage longerons. The flippers are welded in a continuous weld fitted around the stabilizer to keep it from twisting and operated by a bell crank at the center. A welded steel plate is fitted inside the main elevator cross member and pressed together with nickel steel pins at four points in an additional valve, fuselage.

Although the spreader bar type landing gear is standard, shock absorber type was built in slight extra cost. Landing gear travel is 6 ft. 4 in. with the wheel position lock inches in front of the center of gravity. Castanary shock coil absorbers are used. The landing gear struts are cross braced with wire and are braced to the lower longerons. Struts have 5/16 in. nickel steel bolts.

(Continued on page 1042)



Close-up view of one of the single-strut, experimental models of the "Golden Eagle" monoplane

# Purchasing and Receiving the Materials

By EDWIN R. DOUGLAS  
Consulting Engineer

THE five articles of this series pointed out to the foundation of modern management is cost, cost, cost! In the six succeeding articles, we have considered the methods of applying this knowledge to actual production, both through the control of operations performed by labor and the control of the materials. Both labor and raw materials are commodities which must ordinarily be purchased in the market. The purchasing of labor is now, in most plants, considered in an employment department, which can handle it far more satisfactorily than can the individual superintendents and foremen. The purchasing of materials is, for a similar reason, almost universally handled by a purchasing department. At this point, we shall take up the functions of the latter department.

The purchasing department stands between the plant and the outside supplier and must regard its duties from two distinct points of view. One is that of price, terms, and deliveries; the other, that of quality, quantity, ability, and urgency of requirement. These are, however, but two sides of one subject. Neither can be held at all loose. Experience, and each need motive full acquaintance in every purchase. Nevertheless, in many cases, it is former years especially, the purchasing agent has considered his duty done when he has bought at the lowest price, without much regard for quality and fitness. Happily, this stage is passing.

## Complete Information Necessary

But the purchasing department cannot buy both economically and satisfactorily, unless it knows what the requirements really are. Too often, the purchasing agent has been blamed when the fault lay in the factory itself—in the incomplete knowledge of what was needed and what the market afforded, the faulty judgment of the factory personnel as to requirements, and the failure to specify clearly what was to be made. Here, indeed, is seen the need both of exact knowledge and of full co-operation—knowledge, one more of "What," How, "Where" and "When" and co-operation between those who store can supply that knowledge and those who must receive and transform it.

The original information and final decision as to what materials are required must come from the technical division (the departments of engineering and research), and from skilled craftsmen in the shops. This information will be embodied in drawings, or corrected in revision drawings issued by engineering and research departments to the purchasing, stores, and planning departments. It must be clear, exact, complete, unambiguous. In cases of doubt, questions must be referred back to the technical division for settlement. Neither the planning, stores, nor the pur-

chasing department is qualified to pass on such questions.

This information may refer either to materials to be kept as standard stores, or to those to be specially purchased. In the former case, it must be noted either directly on the stores ledger sheets of the materials affected, or, if too detailed or too numerous, placed in a file of standard and purchasing specifications and cross-referenced to the stores ledger items affected. In either case, when a new

Fig. 1 A requisition form in the purchasing department. Note the spaces provided for showing the purpose for which the material is needed.

supply of these materials is to be ordered, a copy of this information, or these specifications with any necessary comments, must accompany the request for purchase.

If the materials are to be specially purchased, the information as to character, and quality will refer to the production order number for which they are required. In this case, the planning department is interested, but the stores department is not, as no records are not affected. Hence, a copy of the special information must accompany the request for purchase.

So much, at present, as to What. The real problems are

How Much and When. The source of this information, for standard materials, must be the stores ledger, with its balances and statements as to quantity on hand, or available, or provided. (This was discussed in the preceding article.) In the latter, previously and extensively mentioned, the stores clerk is provided with a very efficient instrument for controlling the ordering and supplying of all the items therein needed. Particularly when the full current form of ledger is used, showing "balances provided," quoted in advance from the production specifications (see the third article of this series, which appeared

Fig. 2 A printed "request for quotation" form.

in AVIATION, the issue of August 18, 1938), the stores clerk is in position to supply all standard requirements, with no "hold-ups" and with the very minimum of scope kept on hand and needing capital. When, as any article in the ledger shows the balance falling below the set minimum, he is automatically notified to re-order. This is over the When.

The How Much is next determined. This will depend upon the quantity required by the order being newly placed and on the activity of the material as evidenced by recent withdrawals and prospective requirements. Here, the chief stores clerk must confer with the planning, engineering and sales departments to find what the prospects are and, here, full co-operation is needed. Such development goes as far as daily lunch-dish pathways or weekly production round tables or very enlightening if wisely used, and the chief stores clerk, as well as the production manager, engineers, purchasing agent, and salesmen, should be involved in such decisions. The question of How Much requires collective thought and collaboration. When it is settled, the chief stores clerk is in position to make a negotiation on the purchasing department, stating what and how much he requires and when it should be in hand.

In the case of special materials, the How Much is that quantity called for on the production specifications of the order. A copy of this specification with special materials

noted, sent by the planning to the purchasing department, may be all that is required, or, if desired, the planning department may fill out a formal requisition for the special materials.

In some cases the quantity of special material required is so small that it cannot be bought (such as a requirement for a few dozen special nuts or rivets, where a full box is the smallest market commodity). In such cases, the quantity ordered must be increased and the extra material, it keeps in the storeroom, becomes an "odd stock" and a nuisance. If not kept in the storeroom it is left around the shop and lost, or carried home by some thrifty employee. This situation sometimes cannot be avoided, and then the "odd stock" alternative is the better one. But where possible, it is best to order only the quantity of special materials required for the case in hand. Stocked stock as accumulations should be listed, and copies of the list should be issued periodically to the engineering department, repair men, and others who may have occasion to use it. Items which are not used up in a reasonable time, and for which no one seems likely to be forced, should be sold or scrapped, so that the list is kept down to reasonable size.

## Purchasing Agent Places Order

Returning to the matter of purchases, all information as to What, How Much and When is now in the hands of the purchasing agent, and it is up to him to determine when he will place the order, depending upon quality, price and delivery offered by suppliers on his list. Sometimes that will have been settled by fixed contracts for the material, against which his purchases must apply. There is no conflict then in standard materials and in quantity. Sometimes he knows from recent experience, and with our further inquiry, where he can place the order to the best advantage. Often, however, he will need to get quotations from several suppliers. On less important materials, this is always a matter of routine that can be handled by an intelligent clerk in his department; but on large and important purchases the ability and best efforts of a high-class purchasing agent are most too good. In such cases, such correspondence may be required, with exchange of data, samples and tests, visits from salesmen, and visits of the purchasing agent to other plants. Here, personality, tact, training, and experience count greatly in getting favorable responses; but these are subjects in business psychology beyond the scope of the present discussion.

For handling the acquiring responses and data secured, there must be systematic methods, forms and filing systems, else the purchasing department will become chaotic.

## Further Routine Steps

The routine steps to be taken toward the purchase of material, whether standard or special, are as follows:

1. The first formal step is a "Request for Purchase," made out by the chief stores clerk or other authorized person, and sent to the purchasing department.
2. The second step is simply the forwarding of a "Purchase Requisition" and the mailing out to selected suppliers of "Requests for Quotations."
3. The comparative of bids, forwarding of them to the purchase record, discussion of them with the engineer at the request and decision as to which bid shall be accepted.
4. Mailing out of a purchase order and sending it to the favored supplier, with necessary copies for office use.
5. Receipt of materials, making of "receiving records" and notations to those concerned.

(Continued on page 1434)

# Airplane Engine Ignition

*A Discussion of the Advantages of Both Battery and Magneto Ignition Systems for Airplane Engines*

By A. H. PACKER

AVIATION ignition at the present time has reached a state of reliability that is highly gratifying, but the reliability is due to the duplication of equipment as well as to the perfection of that equipment. Perhaps no other factor is more vital to the successful functioning of the engine than good ignition and there is no other subject of greater significance from a commercial as well as from an engineering point of view.

At present ignition design centers on reliability, but with reliability attained may there not be some other factor to influence design a few years from now? With increased experience, considerations of cost may even enter. Then there is weight, free landing, safety and performance to consider. And behind the whole problem will be the question of basing the design on magneto, accumulator, or both systems and generators becoming more common, on the battery system as the fundamental ignition unit.

The discussion which follows is intended to bring out engineering fundamentals having a bearing on any kind of magneto or battery ignition system and is not intended as a specific reference to any particular make of ignition device. Where fundamental difficulties in any type of system are encountered it is always possible by superior design, materials or workmanship to neutralize their influence. Similarly with a design that is inherently ideal it is possible to sacrifice the natural advantages if the details of construction are neglected in any way.

With reliability to be considered first, the high tension magneto system as a point is being an independent system needing nothing but service to the spark plugs to make it work. The battery ignition, on the other hand, requires a battery, a switch with wires and connections for the primary circuit, in addition to its high tension magnets. And in case of corroded switch contacts or burnt switch finger

the result in the case of battery ignition would be to weaken or kill the spark, whereas with the magneto it would only prevent starting of the engine.

The battery system also has an inherent weakness in depending on the storage battery as a source of primary current, for a short in the wiring might put the battery out of commission, in addition to creating a fire hazard, while the functioning of the ignition on the generator current would depend on maintaining the engine speed above the critical point of the generator—usually easy to do, but still an inherent weakness in the system.

From the standpoint of leaving trouble on the plane the battery ignition system has the advantage, for the amateur aviator with the switch thrown right or left will show whether normal primary current is flowing, whether points make contact or not and, under certain conditions, will even show whether a condenser is shorted.

## Magneto Easily Inspected

The magnets on the other hand cannot be readily tested without removing it from the engine. Inspection, however, will show whether the points are making and breaking. And inspection will show whether the distributor brush is in position or not and whether the distributor block is set or skewed. With the magnets apparently tested correctly and no evident defect in distributor or interrupter it is desirable to try it with the primary wire to switch disconnected. Then if it does not fire it is usually found necessary to remove it for a test on the bench.

One advantage the battery ignition system offers has been that it gives easy starting without auxiliary devices such as booster magnets, required for easy starting with magneto.

(Continued on page 1432)

# The "Starwing" Monoplane

*A Two Passenger Externally Braced Low Wing Monoplane Powered With a 60 Hp. Five Cylinder Le Blond Engine*

FOLLOWING a series of test flights, production of the "starwing" monoplane is soon to be started by the American Aircraft Corp. of Mission, O. The plane, which is the result of a year of development, is a two passenger, externally braced, low wing type, powered with a five cylinder Le Blond engine, developing 60 hp. at 1800 r.p.m. Several interesting features are embodied in its design.

The Starwing has a span of 29 ft., an overall length of 33 ft. and is 6 ft. 6 in. high. The weight empty is 749 lb. and the payload 280 lb. In the course of the tests the plane attained a high speed of 103 mph and made a 300 mile trip with an average speed of 94 m.p.h. The landing speed is 23 mph.

In conference with conventional practice the Starwing has a wood wing structure and a fuselage of welded steel tubing. The fuselage is constructed in the form of a Warren truss, tapering toward the tail, well streamlined and presenting a clean appearance. Ample room is provided for both cockpit and the tandem seating arrangement was adapted to afford greater comfort on long cross-country flights. Both magnets are fitted with windshields and a streamer, headrest is provided for the pilot in the rear.

Landwheel spruce box spars are used with spruce members in diagonal webs on both main and cross-bracing. The webs are of diagonal three ply mahogany. Ribs are constructed of spruce laminas with three ply mahogany grooves and are very light in weight. These ribs are made in the external drag bracing of each wing panel with steel tube compression members, and double diagonal bracing of hard wood and glass-reinforced "U" type tubing is used to form the trailing edge. All internal parts are finished with Lincol and ground A. Aileron is used for covering. The standard clamping and landing process is employed.



Side view of the Le Blond powered "Starwing" monoplane.

The wing chord is constant throughout the span and tapered in thickness. A specially designed airfoil section is used. Wings are attached to the lower fuselage longerons by means of bolts and are externally braced by inverted vee type compression struts of special design and placed in such a position that it is unnecessary to climb over them in entering either cockpit. The spars are not continuous and are independently attached to the fuselage. The rear spar strut attachment is adjustable to correct for any wing twisting, which might occur through slight warping of wings after the plane is placed in service. Fittings are so designed and placed as to eliminate unsightly corner braces.

The specially designed landing gear has a rear foot wheel and mainwheels 26 x 4 in. wheels. This gear is of the divided axle type, each wheel having one rubber member attached to the fuselage and the other to the rear spar of the wing. The shock absorber strut is attached

(Continued on page 1433)



Left—An Etek battery, type 6TX-35. Center—An Etek combustion head and electric motor starter with a Hart Magneto 25-14-A. Right—A Scintilla magneto, type T-409-D.



Front view of the new "Starwing" monoplane, equipped with a 60 hp. Le Blond engine.







# Aviation Country Club Established

*Long Island Organization is First of Nationwide Chain*

NEW YORK, N. Y.—Completion of the organization of the Long Island Aviation Country Club was announced yesterday by the club's executive committee. The club, which is the first of the chain to be established in the United States, is the first of the chain to be established in the United States. The club, which is the first of the chain to be established in the United States, is the first of the chain to be established in the United States. The club, which is the first of the chain to be established in the United States, is the first of the chain to be established in the United States.

## To Develop 120 Aero Site

The board of approximately 110 members of a club will approach the 110 acres located just east of Westbury, L. I., and acquire the same property, and an estimated \$100,000 of property to a flying field, the erection of the clubhouse and hangars, property and improvements, plans completed, will cost approximately \$100,000.

# Uses Traffic Report Blanks

OKLAHOMA CITY, OKLA.—Special Airplane Blanks are used by the Bureau Air Lines, carrying passengers between this city and Tulsa, Okla., and carrying mail between Tulsa and Oklahoma City. The blanks are divided into five main columns headed "Date," "Oklahoma City to Tulsa," "Tulsa to Oklahoma City," "Complementary Passengers," and "Daily Totals."

Number of trips and number of passengers are listed in the second and third columns. The fourth column is headed "Complementary Passengers" and is used to list the names of passengers who are traveling on complimentary tickets.

Complimentary tickets are issued to passengers who are traveling on complimentary tickets. The fifth column is headed "Daily Totals" and is used to list the total number of passengers who are traveling on complimentary tickets.

## Nebraska University Giving Aero Course

LINCOLN, NEB.—Aeronautics is now listed as a regular course in the mechanical engineering department of the University of Nebraska. The instructor of the course is Dr. W. W. Hays, who has made a special study of airplane mechanics and flying at a later session airplane manufacturing plant.

## Roller-Smith Names Agent

NEW YORK, N. Y.—Arthur H. Abbott, Inc. Boston Mass., has been appointed New England district sales agent for the Roller-Smith Co., New York City.

# Building Plane to Save Expense in Traveling

KANSAS CITY, MO.—A Kansas City resident is spending \$15,000 to build a small motor-driven airplane which will be used to travel on trips between his home in Kansas City and Los Angeles, Calif. The plane is being built by the resident, who is a member of the American Aero Club. The plane is being built by the resident, who is a member of the American Aero Club. The plane is being built by the resident, who is a member of the American Aero Club.

## Ford to Produce One Transport Plane Daily

DETROIT, MICH.—The Ford Motor Co. plans to enlarge its airplane manufacturing division sufficient to produce one transport plane daily, according to a recent announcement by officials of that organization. The company now builds an average of three planes per week, at 20 orders for transport planes. The new plant will be built, equipped with Ford V-8 engines, will be delivered to the Transportation Air Transport, Inc. The new plant will be built, equipped with Ford V-8 engines, will be delivered to the Transportation Air Transport, Inc.

## Bremen Joins Consolidated

NEW YORK, N. Y.—A Bremen, newly formed company has been announced by the Consolidated Investment Co., Inc. New York City, in the capacity of director. The company is being organized by that company. The company is being organized by that company. The company is being organized by that company.

# Wichita Company Goes To Open School Chain

WICHITA, KAN.—Mr. Service, Inc., a national retail store chain, has opened its first school chain in Wichita, Kan. The school chain is being organized by the company. The school chain is being organized by the company. The school chain is being organized by the company.

## General Electric Plans To Exhibit New Light

LOUISVILLE, KY.—The General Electric Co. plans to exhibit a new type of light for night flying at Bowman Field, the Louisville airport. The new light, which is known as the "Night Light," is being exhibited at Bowman Field. The new light, which is known as the "Night Light," is being exhibited at Bowman Field.

## Bradway Made Head Of Air Service Corp.

OKLAHOMA CITY, OKLA.—Air Service Corp., Oklahoma City, has been announced by the company. The company is being organized by the company. The company is being organized by the company. The company is being organized by the company.

# Begins Tests on Plane Parachute

LOS ANGELES, CALIF.—Howard McElhenny, former airplane engineer, has begun tests of his full-sized airplane parachute in the vicinity of Los Angeles, Calif. The parachute is being tested by the company. The parachute is being tested by the company. The parachute is being tested by the company.

# Schinzinger Records Recognized by F.A.I.

WASHINGTON, D. C.—Official notice that the records of the National Aeronautics Association have been received by the Fédération Aéronautique Internationale. The records include the records of the National Aeronautics Association. The records include the records of the National Aeronautics Association.

## Seek Springfield Plant Site

SPRINGFIELD, ILL.—Oswald M. Hinton and George White, who are building an airplane factory in Springfield, Ill., are seeking a site for a new plant. The new plant is being built by the company. The new plant is being built by the company. The new plant is being built by the company.

## Lady Heath Dared November 8

NEW YORK, N. Y.—Lady Heath, British aviator, who recently established a flight record of 2,000 ft. in a biplane, is expected to arrive in New York on November 8. The flight record is being set by the company. The flight record is being set by the company. The flight record is being set by the company.

# Newspaper Men Get Aero Course

Cincinnati Scriber Receives Brief Training at Ludlow

CINCINNATI, O.—New Cincinnati newspapermen received special short course in aviation at Ludlow, Ky. The course was arranged by the Ludlow Flying Club, president of the Ludlow Flying Club, who is a member of the Ludlow Flying Club. The course was arranged by the Ludlow Flying Club, president of the Ludlow Flying Club, who is a member of the Ludlow Flying Club.

## Fight Demonstration Included

General approval of the plan was given by the newspapermen, who agreed that the demonstration was a very successful one. The demonstration was a very successful one. The demonstration was a very successful one. The demonstration was a very successful one.

## Consolidated Has Laboratory

NEW YORK, N. Y.—Consolidated Investment Company of America, Inc., 41 Broadway, New York City, has announced the establishment of a completely equipped laboratory in connection with New York laboratories. The laboratory is being built by the company. The laboratory is being built by the company. The laboratory is being built by the company.



## Reviews

The Book Department, Aviation, 210 West 15th St., New York City, 20, has just published a new book, "The Development of the Airplane," by the late Captain William F. Stout, which is a valuable addition to the literature of aviation.

**Manual Aeronautics Committee for Aeronautics**—The Aeronautics Committee for Aeronautics, 210 West 15th St., New York City, 20, has just published a new book, "The Development of the Airplane," by the late Captain William F. Stout, which is a valuable addition to the literature of aviation.

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## Swift Firm in New Quarters

**WICHITA, KAN.**—The Swift Airplane Company, manufacturing monoplane and biplane aircraft, has moved into its new factory, purchased from the late Captain William F. Stout, which is a valuable addition to the literature of aviation.

The Swift Company just moved a new airplane into its new factory, which is a valuable addition to the literature of aviation. The new airplane is a biplane, and it is a valuable addition to the literature of aviation. The Swift Company is a leading manufacturer of aircraft, and it is a valuable addition to the literature of aviation.

## Continental Planning To Produce Engines

**DETROIT, MICH.**—Production is expected to start early in 1939 on the first aircraft engine development of the Continental Motors Corp., according to a statement made by Robert Leiby, chief engineer of the aerodynamic division of that company. The engine, which is a new design, is expected to be a valuable addition to the literature of aviation. The Continental Motors Corp. is a leading manufacturer of aircraft engines, and it is a valuable addition to the literature of aviation.

## Six Flying Schools Now in Kansas City

**KANSAS CITY, MO.**—There are now six flying schools in Kansas City, Mo., which is a valuable addition to the literature of aviation. The schools are a valuable addition to the literature of aviation, and they are a valuable addition to the literature of aviation.

Mr. Reed also pointed out that 22 schools are now in the aviation business in Kansas City, with nearly 400 persons employed and a payroll of about \$1,000,000 a year. One million dollars also is invested in the business while new firms are being started. The schools are a valuable addition to the literature of aviation, and they are a valuable addition to the literature of aviation.

## Trade Tips

It has been reported that—

—Charles F. Bud, 220 W. 37th Street, New York City, is in the market for a new place, place, to be used in keeping records and control equipment.

—The Associated Chapter of Commerce is in receipt of an inquiry from J. W. McKinnis, 120 W. 37th Street, New York City, who is in the market for a new place, place, to be used in keeping records and control equipment.

—He will shortly be in the market for a new place, place, to be used in keeping records and control equipment.

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## AIRPORTS AND AIRLINES

### New Company to Operate New York-Chicago Service

### Eight Hour Flying Schedule Will Be Maintained With Wasp Powered Ford Monoplanes

**CHICAGO, ILL.**—The formation of the New York, Chicago and Pacific Airways Co. for the establishment of regular air passenger service between Chicago and New York by way of Toledo and Cleveland is reported here. The firm, which will have an authorized capital of \$500,000, has headquarters at 20 E. La Salle Street. Service on the Chicago-New York route is planned to start as soon as the first two Wasp-powered Ford Tri-engined monoplanes can be obtained. An eight-hour schedule will be followed, although it is expected that the planes will make the flight in less than seven hours.

Plans will leave New York and Chicago at 12 noon daily, at Cleveland and Toledo at 12 noon, and at Chicago at 12 noon. The New York, Chicago and Pacific Airways Co. will be the main carrier of the line, with the Ford Tri-engined monoplanes as the main carrier of the line.

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### Air Mail Saves Interest Money

**CHICAGO, ILL.**—Much savings by having business is evidenced by the air mail service, in a statement made here by the National Air Transport, Inc., stating that the cost of the service is less than that of the express. The National Air Transport, Inc., is a leading carrier of air mail, and it is a valuable addition to the literature of aviation. The National Air Transport, Inc. is a leading carrier of air mail, and it is a valuable addition to the literature of aviation.

### Bronte Making Pacific Coast Airports Survey

**LOS ANGELES, CALIF.**—Henry Bronte, president of the Bronte Air Transport, Inc., is making a survey of the Pacific Coast airports for the aviation department of the Associated General Contractors of America. The survey is a valuable addition to the literature of aviation, and it is a valuable addition to the literature of aviation.

### Firm Gets Wilmington Hangar

**WILMINGTON, DEL.**—A hangar has been secured at Wilmington Airport, Delaware, by the Wilmington Flying Service, Inc., which operates two twin-engine planes. The hangar is a valuable addition to the literature of aviation, and it is a valuable addition to the literature of aviation.

### Service Firm for Oakland

**OAKLAND, CALIF.**—The Auto Maintenance Supply Co. has been given a contract by the Oakland Municipal Airport and will specialize in the washing and servicing of planes.

### Carries 1000 in Two Weeks

**BALLAS, TEX.**—In the past two weeks, 1000 passengers have been carried over the city by the tri-engined Ford monoplanes used by Rapid Air Lines, Rapid City, N. D.

### Angie Traffic Assured

The assurance of ample passenger travel is given by the fact that the city has secured a new airport office in the Public House, which reports that it receives more than 100 passengers daily.

### Named Ohio Firm Agent

**LOS ANGELES, CALIF.**—The Ballou & Walter Airplane Co. of this city has been named Pacific Coast agent representative of the Ohio Auto Manufacturing Corp. of Youngstown, O., American plane builders. Dealers will shortly be appointed by the Ballou & Walter firm, which has placed an order with the Ohio company for 15 planes for fall delivery.





## Buyers' Log Book

### Aeromarine Inertia Starter

ONE OF the most recent developments of the Aeromarine Starter Co., Inc., Kerpore, N. J., is the Type C small aircraft inertia starter, designed for aircraft engines up to 1850 cu. in. displacement. This unit has been developed to meet the demand for starting equipment on the smaller engines in commercial and private-owned aircraft.

The type C starter weighs but 17 lb. less crank, is 5 1/2 in. in diameter and has a maximum diameter of 6 1/2 in. The standard starting torque setting is 500 ft. lb. and provision has been made for combined transverse and longitudinal hand cranking. It also can be supplied with electric motor drive.

Installation difficulties are overcome by the large angular capacity universal joint in the handcrank shaft, which

Type C Aeromarine starter for engines up to 1850 cu. in. displacement



permits the hand crank to be left off horizontally and longitudinally and in all intermediate positions whereby the one machine covers the entire range of installation requirements.

The same standards of workmanship and efficiency, which characterize the well-known military types are maintained in this new and eminently priced starter unit which an extensive production schedule is underway.

The special hand crankshaft joint arrangement permits of starting either from the side of the housing, or by the more random disposition with the hand crank in the cockpit, which gives strictly one size starting.

### Portable Grinder and Buffer

A NEW portable grinder and buffer equipped with a 1/2 hp. ball bearing motor and Teflon roller bearing grinding speeds has been placed on the market by the Huey-Wolf Machine Co. of Cincinnati, O. For after-racing cleanup, etc., a commutating type regulation induction motor is provided for single phase service and a squirrel cage motor for two and three phase service. A compound wound motor is furnished for direct current.

The motor is controlled by a two point switch located in the grip handle and a cast steel wheel guard is provided. This guard is adjustable to any desired position. The various sizes include 1, 2 and 3 hp. for alternating current and 1 and 3 hp. direct current.



Trade Mark Registered

The above  
trade-mark  
identifies the  
genuine mohair  
fabrics made

by

*The Shelton Looms*

335 Fourth Avenue  
New York, N. Y.



## STYLE . . . style in the air with du Pont finishes

EVEN the most conservative enthusiasts are decking out locomotives and coaches like Joseph's coat—no self-denial necessary. All industry warships at Beauty's altar. "When the prospect returns, 'What's lovely please'?", says a prominent aircraft manufacturer, "I mark a cross on the du Pont line."

\*Du Pont pioneered the color field; today special du Pont finishes are giving the airplane manufacturer an unlimited opportunity to look at on this powerful selling force. Ducco, Pyralis, Fabulohol, du Pont Pyralis, Varanish and Dope—every du Pont product is "style" intuitively in design, texture, or color.

Feel free to call on the du Pont Color Advisory Service (New York)—Partly to help solve your specific color problems.

Materials created specifically for their special purpose.

Du Pont Aircraft Finishes and fabrics are scientifically correct, each for its purpose. Each also meets the same tests both in the chemical laboratory and in actual flying service. Pigments, for example, must be optically as well as chemically correct.

Here is additional functional utility which you recognize and which ordinary finishing materials cannot approach. When you mention the name "du Pont", your customer recognizes it.

Du Pont engineers are at your service.

*Attractant Finishes and Fabrics that look and perform better*

*Du Pont Pyralis and Varanish* Du Pont chemists have developed a complete line of paints and varnishes, including Dope-proof. Pyralis, water-resistant Spar Varnish, and engine finishes.

*Du Pont "Living Dope"* The du Pont line of nitrate dopes includes many novel formulas remarkable for light and durability. Impenetrable, airproof, hard yet flexible, remarkably resistant to violet rays. Available

in a wide variety of highly visible colors.

*Fabulohol*—Sandy Fabulohol is an ideal material for open cockpit upholstery. Will withstand all weather conditions. "Nemours Aircraft Fabrics" air new type, lightweight materials developed for interior trim of cabin ships. Made on a high-grade woven cotton base and treated with appropriate pyrolytic colors. Embossed an distinctive patterns.

*Du Pont Pyralis*—A strong, durable, light, unbreakable, transparent material furnished in any gauge from 5-1000 upward in sheets approximately 26 inches x 50 inches. Ideal for windshields, cabin windows, running lights and other uses where an unbreakable, transparent material is required.



E. I. DU PONT DE NEMOURS & CO., INC.

Du Pont Visceloid Co., Inc., 320 Fifth Ave., N. Y. C.

Chemical Products Division, Parlin, N. J.

Fabulohol Division, Newburgh, N. Y.

MEMBER AERONAUTICAL CHAMBER OF COMMERCE

## Bakelite Sight Gauge

A NEW type of wing tank gauge made from bakelite has recently been developed by the Apex Specialty Co., of New York City. The transparent bakelite used in making this device, is lighter than glass, and also stronger. Because of the machinability of the material it may be faced with any brass setting and threaded at the ends thereby making the installation very simple in its pack.



The new transparent bakelite sight gauge for wing tanks developed by the Apex Specialty Co.

ing glands are required when connecting the gauge to the oil or fuel lines.

The sight gauge is not affected by sudden temperature changes which is another advantage found in this type of instrument.

## Galion Road Machinery

WITH THE rapidly increasing number of airports throughout the country a necessity has arisen for road machinery to be used in the establishment, development and maintenance of these fields and their approaches. A full line of machinery for this work is being manufactured by the Galien Iron Works & Mfg. Co., which has

its factory and main offices at Galien, O. The company also produces culvert pipe equipment and other products used in airport construction.

A complete line of rollers and graders, used for the construction and maintenance of roads in and around airports, is included in the products of the company. The Galien Roller Roller is used in road building while the Galien Small Roller is employed to keep fields in condition after they have been established, the smaller roller to keep soil level and firm and to roll gravel and macadam roads. The planer and scarifier manufactured by the company also are useful and the leveling wheel grader is well adapted to this work.

Machinery of this type is now in use at many of the larger airports.

## Cutler-Hammer Rheostat

A REGULATING rheostat to control the speed of fractional horsepower direct current electric motors has been added recently to the products of the Cutler-Hammer Manufacturing Co., Milwaukee, Wis. This device is of the circular type, completely enclosed and is small in size providing a compact unit.

The rheostat unit is encased in contact with brass contact points protruding through the encasing material. Resistance is varied by a contact arm which moves over the points and is actuated by an outside operating lever. The unit is protected by a small enclosing case which also prevents accidental contact with the current carrying parts.

The rheostat can be mounted directly on the machine which it is to control or in any convenient position as it requires very little space. It is furnished for open wiring but if open wiring is to be used a porcelain bushing can be added without altering the original instrument.

## International demonstrate advantages of HASKELITE plywood fuselage



THE International Aircraft Corporation has used HASKELITE plywood almost exclusively in the construction of their planes. The good experience of this company is just another evidence of the satisfactory service HASKELITE will render. International uses HASKELITE for building fuselages, ribs, entering edges, box beams, and similar purposes. An approved type certificate has been granted International ships.

HASKELITE's known ability to stand hard service, its all-weatherproof qualities, great

strength, and light weight have won many manufacturers in meeting the exacting requirements for an approved type certificate. Safety is always first when HASKELITE blood aluminum glued plywood is used. It has proven its efficiency by years of hard service. 85% of the plywood used in aircraft is HASKELITE.

Send for our valuable blueprint booklet of airplane applications.



Haskelite Manufacturing Corporation  
120 South LaSalle Street Room 1120 Chicago, Illinois

Sales & Power Engineering Corp.  
Detroit, Montreal, Winnipeg, New  
Orleans



California Road & Veneer Co.  
316 S. Alameda Street, San Angeles,  
Calif.

THANK YOU for mentioning AVIATION

## The Keystone Aircraft Corporation

ESTABLISHED 1920

and

## The Loening Aeronautical Engineering Corporation

ESTABLISHED 1917

announce the merger of the two companies

Both the Loening plant, 31st Street and East River, New York City, and the Keystone plant at Bristol, Pennsylvania, will continue to operate as at present—thus preserving to the merged company the benefits of the skill and experience acquired by the two established organizations.

In addition to the well-known military types, a complete line of Commercial Cabin Amphibians and Trimotored Overland Transports will be produced by the corporation.

**KEYSTONE**  
KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA



# The SENIOR AIRSEDAN



## EIGHT PLACE—DUAL CONTROL

### Specifications

Wing Span	28.00 in.
Wing Area	31 sq. ft.
Wing Area	403 sq. ft.
Length	31 ft. 1 in.
Useful Load	1,200 lbs.
Seating Capacity	8 Pass., 4 Passengers

### Performance

High Speed (Sea Level)	121 m.p.h.
Cruising Speed	100 m.p.h.
Landing Speed	47 m.p.h.

### Power Plant

Engine	Wasp
Horsepower	420
Fuel Capacity	110 gal.
Oil Capacity	17 gal.

### Equipment

Radio, Radio, Wind Propeller, Gyro, Air Speed Indicator, Variable Pitch Propeller, Altimeter, Clock, Pitot Air Indicator, Fuel, Oil Pressure, and Oil Temperature Gauges, Air Corps Theodolite, Service and Fuel Valve, Exhaust Manifold, Cabin Heater.

Price, \$18,500

Henry or Field, Marysville, Mich.

**Buhl Aircraft Company**  
**MARYSVILLE, MICHIGAN**

## Phylax Fire Extinguisher

EXCLUSIVE DISTRIBUTION rights in North America have been obtained by Command-Aire Inc., Park Ridge, Ark., for the Phylax Aero-Type automatic fire extinguisher which is manufactured by the Thayer Company of Berlin. This apparatus provides a means of reaching fire in those vital parts of the plane which cannot be reached with the ordinary hand type of extinguisher. It is to be standard equipment on all planes manufactured by Command-Aire Inc.

Phylax Aero-Type equipment consists of a tank containing the extinguishing liquid, which is a specially developed chemical. From the tank, which is usually installed in the plane's cockpit or control cabin, sprayers lead to the parts of the plane where fire usually break out, such as the carburetor and oil pump on the engine. Other lines lead through the area where a fire would be likely to break out. These lines contain hoses which, upon being actuated by the fire, release pressure into the tank, forcing the chemical through the various lines to the sprayer heads, which cover the entire power plant. Pressure also can be released by means of a button in the pilot's cockpit or the tank can quickly be removed and used as a hand fire extinguisher.

The tank carries sufficient chemical to extinguish fire of any size and provides a means to protect parts of the plane other than the engine compartment. The equipment is light in weight and easily connected.

## Hutto Cylinder Grinders

TWO CALENDER grinding machines are included in the products of the Hutto Engineering Co., 515 Lyndon Ave., Detroit, Mich. These machines are of rugged construction and are also adapted to the grinding of spiral gun holes in pistons and connecting rods as well as bushings of various types.

The single spindle machine, Model GA, is said to have a production rate of 125 pistons per hr. and to grind 600 pistons with a single set of stones. It is driven by a 5 hp motor through a system of reduction gears and a sliding device tapering rotating and reciprocating motion to the spindle.

The second machine is the Model MGBX, a two spindle unit used for grinding the BS and OS type pistons. Based on the head of the pedestal in a horizontal shaft directly driven from the 2 hp electric motor and actuating two worm gears. The second gear near the motor carries an eccentric. Linked to the eccentric is a walking beam which reciprocates the spindle at a speed of 100 strokes per min. through the head of the second gear which actuates the spindle to rotate at a speed of 200 rpm. The stroke is variable from 0 to 3 in.

## Portable Oil Dispenser

A PORTABLE two compartment oil dispensing unit is included in the line of fueling equipment offered by S. P. Bonner & Co., Inc., Fort Wayne, Ind. This unit has been designed to provide a means of handling two different grades of lubricating oil.

Two pumps, each fitted with a 15 ft. length of flexible kerosene hose, permit direct delivery of oil from either storage tank to the oil reservoir on the plane. The pumps deliver pints, quarts or gallons so that any desired quantity can be easily and quickly obtained.

In order to maintain accurate records of the quantity of oil dispensed the pumps are fitted with recording meters. A rack is provided on which the hose may be coiled when not in use.

# VELIE M5 AIRCRAFT ENGINE



**Smashes all  
Records for  
ECONOMY**  
(with Dependability)



**2300-mile Flight in 23½ Hours Made  
by the Monocoupe with Pilot and one  
passenger at a total cost of \$24.50**

This remarkable record for economy was established on September 3rd by Vern Roberts, test pilot, accompanied by Dr. (Scotty) Burwood, service man for Velie radial motors. This Monocoupe powered with the famous Velie M5 aircraft engine flew from Moline, Illinois, to Los Angeles, California in 23 hours and 30 minutes.

Twenty-five miles per gallon of gasoline, totaling 90 gallons for the entire trip, at 23 cents per gallon, and two gallons of oil at 40.00, making a total cost of \$24.50 for the

entire trip, or \$12.25 per passenger. Never before has the world known of such swift, economical transportation.

The sturdy Velie 5-cylinder radial aircraft engine is designed, engineered under the closest supervision, and manufactured to the highest standards of precision.

We invite inquiries from airplane manufacturers and others who would avail themselves of the opportunity to secure full details of this remarkable engineering achievement—the Velie M5.

VELIE MOTORS CORPORATION, Moline, Illinois

"Ask the Pilot"

*Long Life* **VELIE**

DESIGNED AND OPERATED  
BY ITS PIONEER  
1908-1938

## Improved G. E. Motor

AN IMPROVED type of single phase, repulsion induction motor to supplement the present SCR line, has been announced by the General Electric Co., of Schenectady, N. Y. This motor, made in sizes developing 3½, 1½ and 2 hp. at 1,800 r.p.m., is of the constant-speed, high starting torque type. It is adaptable to many uses in the aircraft factory or machine shop.



One of new motor showing constant speed.

One of the most important requirements in the more efficient use of the motor packages. This is accomplished by taking full advantage of the design possibilities of the repulsion motor. Combined with the change in design a modification has been made in the "servomotor" and brush rig dimensions as the pulley end shield, thus giving the motor a symmetrical appearance. The motor is equipped with phosphor bronze water-packed bearings of the same size at both ends.

The motor is enclosed except for ventilating openings in the lower portion of each end shield. Air is drawn through the ventilating openings at the pulley end and by means of an internal fan, passes around the motor bearings and out through the ventilating openings in the commutator end. This construction makes a practically

enclosed motor and provides complete protection against falling particles and splashing water.

In spite of this, and the small size of the motor, it is designed to operate within a temperature rise of 40 deg. C. This materially broadens the field of application, permitting the use of a standard 40-horsepower motor in many cases where only a larger, closed motor would otherwise be chosen.

## The "Starwing" Monoplane

(Continued from page 1429)

to the forward spar. The points of attachment of the leading gear to the spars are directly below the strut points and the external wing bracing therefore serves a dual purpose. The position of the wheels are placed considerably forward of the center of gravity in order to decrease the possibility of tail-high landings. The tail skid is constructed of welded stainless steel tubing and is non-servoable.

Standard equipment includes dual controls with a removable stick in the passenger's cockpit. All control surfaces are constructed of welded steel tubing. Elevators are actuated by a steel push pull tube and lateral movement of the stick causes the tube to turn about its axis in circular guides. This control is so designed that the tube is in tension rather than compression when the plane is pulled out of a dive. Push pull tubes are also used to operate the ailerons and fiber lined guides are placed at short intervals in the system. Differential action resulting in a downward movement of three inches and no upward movement of five inches at the trailing edge is obtained without the use of external bracing.

# Introducing the STARWING

## a two place monoplane that you will like



Length	23 feet
Height	6 feet, 6½ inches
Weight	749 pounds
High Speed	105 M. P. H.
Cruising Speed	95 M. P. H.
Landing Speed	35 M. P. H.
Span	29 feet
Cord	67 inches
Fuel Consumption	5 gal. per hour

Powered with a Le Blond 60,  
5 cylinder, air-cooled motor

Performance figures are based upon tests conducted under favorable conditions.



American Aircraft Corporation, Massillon, Ohio



## Atlanta lights Up



Candler Field, Atlanta, Ga., is completely lighted to General Electric specifications. The G-E equipment includes a rotating beacon, boundary and obstruction lights, a ceiling pro-

jector, and transformers and control equipment. The illustration shows the light produced by a G-E arc mechanism in a BBT floodlight. Power is supplied by a G-E motor-generator set.

711-18

# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y. SALES OFFICES IN PRINCIPAL CITIES

THANK YOU for mentioning AVIATION

THANK YOU for mentioning AVIATION



Control-lever Position  
for Landing and Take-off  
in the Lee-Whizit Plane

Model F. Lee-Whizit, Normal  
and Extraordinary, in the  
Lee-Whizit Plane

# The World's Leading Flying Suit

**Veteran of Famous Flights  
and Thousands of Flying Hours  
including the United States Air Service**

## 10 Famous Features—

Model: Long-Fit Collar and Blouse—

Best-Fit: Long-Fit Collar and Blouse—

The Procter Lee-Whizit Flying Suit—

Long-Fit: Long-Fit Collar and Blouse—

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**Lee-Whizit**  
Flying Suits—Union-Aids

Must be worn  
"Always"

Please read the entire and full details  
in the Lee-Whizit Flying Suit

Name \_\_\_\_\_

Address \_\_\_\_\_

Control forces are applied to the aileron large centers at two points by means of a ball-ended floating boom arrangement. The rudder is controlled by cables. Tail is fed by gravity through a flexible line from the 20 gallon tank located behind the firewall. A two gallon oil tank is placed just behind the engine which is carried



Side quarter view of the "Starling" in a new low wing monoplane which will soon be placed in production

on a detachable mounting. All of the cowling is removable and all parts of the power plant are readily accessible.

Equipment includes magneto switch, choke and spark controls, tachometer, oil pressure and temperature gauges, gasoline gauge and right and left throttle controls, actuated by four moving tubes. Warning air lights or radio also can be furnished.

The standard color scheme provides orange fuselage with an orange stripe around the edge, orange color wings and black cowling.

The specifications furnished by the manufacturer are as follows:

Overall length	23 ft.
Height	6 ft. 6 in.
Chord	6 ft. 6 in.
Span	26 ft.
Wing area	150 sq. ft.
Weight empty	1,500 lb.
Power plant	100 hp.
Load factors	
High speed	1.7
High altitude	1.4
Reversed flight and dive	1.2
Performance	
High Speed	105 m.p.h.
Cruising speed	85 m.p.h.
Landing speed	45 m.p.h.

## Airplane Engine Ignition

(Continued from page 1405)

radio ignition systems. The battery voltage is always ready to give full spark intensity, although at high speed the battery ignition spark tends to decrease in heat value, which is not true with magneto ignition.

The magneto spark, though weak at very low speeds, increases in strength up to a certain point and then tends to maintain a constant heat value, thus giving ideal ignition at all operating speeds. Now is the need of the booster magneto a serious disadvantage at present, although it might become so at some future date when competition necessitates elimination of all but the absolutely essential equipment units.

Even at starting, however, has its drawbacks, for there is also the time of having the engine kick back in case the engine is not thrown just right or the kick back device is not functioning. Under these conditions the kick back might occur if the propeller is turned inadvertently.



## Cessna Facts

The National Air Race proved CESSNA SUPERIORITY—not only over other open class ships—but over ALL TYPES.

In Class A, Bushard won. In Class B, Schultz, in his Whitehead powered Cessna, won the fastest time of any ship, open or closed, carrying a commercial license (or approved type certificate) issued by the U. S. Department of Commerce.

Advanced type of construction and engineering makes possible the tremendous speed of the CESSNA. Even with this great speed, however, the Cessna, with a Warner Scarab motor, has an average landing speed of only 43 m.p.h., with a pay load of 307 pounds, including pilot, and 45 gallons of gas and 5 gallons of oil—with an average of 3 tons made at Wichita, in an elevation of 1,000 feet above sea level. With the J-3 Whitehead, the CESSNA, with the same load, showed an average landing speed of only 43 m.p.h. on June 1935.

The CESSNA means more speed, greater stability, easier handling, and, above all, more comfort for four people in its luxurious closed cabin.

These are the reasons why CESSNA today is in the greatest demand at any airport in America—and why CESSNA declares any "closing up."

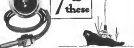
Write or write in for the full story. You'll find it very much worth while reading. Ask quicker—your territory may still be open.

## Cessna Aircraft Company, Wichita, Kansas





# 16 MOTOMETERS ..go with Byrd



COMMANDER BYRD knows his scientific instruments. Consequently we were more than gratified when he selected four Model C Byrd Motometers with special air temperature bulbs as required for the four airplanes he is taking to the Atlantic. These instruments (see Illustration 1) are designed to read in the cockpit the atmospheric temperature on the edge of the wing. The expanded ranges of two Ford instruments, two Fokker and two Patscher planes are equipped with a standard Model C Motometer each, for reading the subsiding air temperature. (See Illustration 2.) Then he took even Model H Motometers (Illustration 3) for reading cooling water temperatures of engines used on tractors and motor boat generating sets, making fourteen Motometers in all. Let Byrd's choice be yours also.

THE MOTOMETER COMPANY, Inc.  
2 Wilbur Avenue Long Island City, N. Y.  
The Motometer Co. of Canada Ltd. Montreal, Can.



(Continued from page 1434)  
12 Closing out of completed purchase orders.  
The forms made use of in the above routine are:  
(a) Request for purchase  
(b) Purchase record card  
(c) Receipt for quantities  
(d) Purchase order  
(e) Receiving report  
(f) Inspection tag  
(g) Invoice register.  
The first four apply to purchasing, and the fifth and sixth to receiving. These are illustrated, or are described in the text, as an accounting form, will be considered as a later article.  
The purchasing department will want to file together all papers relating to one purchase order. So far as possible, these should be of the same size and should be

Fig. 3. A sample purchase order form, showing the common carrier. Note the customer's standard conditions which appear near the bottom.

adapted for vertical filing. Letter-size is the best. The small slips sometimes used for purchase requests are a nuisance. The letter-size sheet encourages giving full data of what is wanted and provides space for purchasing department entries.

Fig. 3 shows a requisition form to the purchasing department. It is particularly important that this request show the purpose for which the material is required by giving the order number, if for a production, maintenance, or replacement order; stock number, if for standard stock; department and expense numbers, if for some expense

## DEPENDABILITY WHEN METAL CONTACTS METAL



the application of extremely hard materials in such parts.

Machine precision is prerequisite to the manufacture of cam rings, gears, etc. The process of heat treatment here employed eliminates the distortions occurring under ordinary methods of treatment, while preserving precision and applying a surface, the hardness of which can be tested only by a diamond scratch. Thus, through extremely hard surfaces, plus strengthened supporting structures, wear is reduced and the life of the part is increased. In adding resistance to wear the hazard of breakage in flight is minimized and true accuracy dependability is achieved.

### AXELSON MACHINE COMPANY

Airplane Motor Division  
Post Office Box 317  
LOS ANGELES, CALIFORNIA

THERE is no economical substitute for quality. Since the inception of the Axelson Machine Company, nearly forty years ago, has been the standard for production. In the manufacture of the Axelson Airplane Motor the same high standard for quality, in workmanship as well as material, stands as the foundation upon which Axelson builds both dependability and durability.

In the production of parts, when metal is forced to contact metal in the production of power, the degree of dependability is measured by durability. To attain these essential elements Axelson can only employ the use of selected, metallurgically proven materials of more than required strength, but Axelson metallurgists introduce a special method of heat-treatment in

(The Second of a Series of Advertisements Pertaining to Axelson Scientific Productions)

amount, and the address or building number, if far remote. This purpose is clear in the mind of the requester when he writes the request, and that is the time to put it down. It is astonishing how often this simple expedient is neglected. Without this information, weeks or months later, it is almost impossible to allocate requests to the correct charges. It becomes a matter of guess work. There will be avoided by putting the charge on the original request in the first place, as illustrated in the sample shown.

This form is made in two copies, bound in a book, the original to be torn out and sent to the purchasing department, the carbon copy to remain in book as record for the requester. These requests should be serially numbered in duplicate for identification.

The purchase record is ordinarily a card or loose-leaf record, letter size, filed either in a vertical file or a binder according to kind and description of material. On it are entered records of quantities received from various suppliers and of orders placed against them. Properly kept, it is a very valuable reference record for comparing prices, terms, deliveries, etc. of different periods and from different sources. A simple ruled sheet is all the form that is required.

#### Partial Form Number 1-10

The request for quotation is sometimes made on a specially printed form, as illustrated in Fig. 2, but it is more common, and ordinarily quite sufficient, to make it in letter form using the regular letter-head.

The purchase order is the most important form in this group. It authorizes the use addressed to other materials or services, it creates a liability; when accepted, it becomes an enforceable contract. A formal acceptance is not necessary. It is sufficient that the supplier, within a

reasonable time, shall have begun taking action toward filling the order. When he has done so, the contract becomes as binding as though it had been formally signed and accepted. After that time changes and corrections may be made by the customer only by grace of the supplier and with liability for their added cost. It is important, therefore, that the purchase order be complete in all details, giving full instructions, with all conditions and reservations plainly stated. It is common practice to have the customer's standard conditions printed on the form as in the sample shown in Fig. 3.

#### Serial Numbers for Purchase Orders

Purchase orders should be serially numbered. They should have copies on them, when typing the serial number of the request for purchase from which they are written and the initials of the requester. All data and information finally given on the request should be copied on the order, including charge accounts, stores, facilities, etc.

The purchase order will be typed with a number of copies, each serving a different use. These will vary, some what in different concerns, but will usually be as follows:

- (a) Original, sent to supplier.
  - (b) Copy for purchasing department's serial file as record of names of suppliers.
  - (c) Copy for file according to order number (house copy, no printing).
  - (d) Copy for requester.
  - (e) Copy for receiving clerk.
- Sometimes other copies are required, as:
- (f) Copy for engineering department.
  - (g) Copy for production department.
  - (h) Copy for auditor, etc.

In choosing suitable qualities of paper and carbon it

# 25

## Years of Aeronautical Progress and AVIATION'S part during the past 12 years

WHETHER you exhibit at the Chicago show or not, you will want to be represented in the International Exposition issue of AVIATION to appear December 1, 1928. In announcing this issue to the aircraft industry AVIATION wishes to emphasize the fact that for twelve years it has taken an active part in the development of the industry that next month celebrates its Quarter-Century anniversary.

A pioneer in its field, AVIATION is America's oldest aircraft magazine. AVIATION established itself early in the history of aeronautics and gained the confidence of those in the business by maintaining it sound, aggressive and constructive editorial service. AVIATION has adhered to this policy and has maintained its leadership, being recognized today as the American authority on aeronautics.

The editorial record of AVIATION in the opinion of leaders in the field has no equal. It has accurately and intelligently promoted and reported American aeronautics since the publication was founded in 1916. With

a larger and more experienced editorial staff than any other American aircraft publication you have assurance of a complete editorial service in connection with the International Aeronautical Exposition as a background for advertising.

To illustrate most from the widespread interest which unquestionably will be created by the Chicago show, regardless of whether or not you are one of the exhibitors, your name and products should be placed before the aviation buying public in the publication that is preferred by those actually engaged in the aircraft business with the added assurance that these informed readers of AVIATION are constantly bringing you products before a widening circle of prospective buyers.

There will be no advance in advertising cost. Closing date for copy requiring proof—November 15. Forms close November 22.

Make prompt reservations to insure favorable position. Write or wire today AVIATION PUBLISHING CORPORATION, 250 West 57th Street, New York City.

# AVIATION

The Oldest American Aeronautical Magazine

TEAR IT OUT FOR AVIATION

TEAR IT OUT FOR AVIATION



SOME TIME AGO we stated that Aerol Shock Absorbing Struts were becoming a factor in the selling of airplanes.

This year the manufacturers who incorporated these struts into their ships have found this to be a fact.

Next year, when supply will inevitably catch up with demand, the marked preference on the part of owners and pilots for Aerol Strut-equipped ships will be a still more active factor in helping alert manufacturers to hold their own in a competitive market.

*Manufacturers are invited to take advantage of the official endorsement that is afforded by Our Engineering and Engineering Departments.*

## THE CLEVELAND PNEUMATIC TOOL CO.

3737 E. 78th Street,  
Cleveland, Ohio

*Also Manufacturers of Grease and Washings  
for Springs for Buses, Trucks and Automobiles*

"Ask the Pilots Who Land on Them"

# AEROL<sup>Shock Absorbing</sup> STRUT

is not difficult to type the five or more copies called for, while it is possible to reduce the set to three by ceasing copies (c) and (e). Experience advances against this. These two copies are well worthwhile.

While it is possible to make numerous variations in the form of the purchase order without impairing its usefulness, the form here illustrated has been used under widely varying conditions and found well adapted to its purpose. It is necessary for the receiving clerk to report daily the quantities, descriptions, sources, and purchase order numbers of all goods received. One method of doing this

Fig. 4. A separate receiving slip for all goods received each day on individual purchase orders.

has been to list all receipts on order on a large sheet of paper, and to send one copy of this to the purchasing department, which sends the contents on its purchase orders. This plan leaves much to be desired. A better plan is to have a separate receiving slip for all goods received each day on each purchase order. Samples of such a receiving slip is shown in Fig. 4. It is made in three copies, one for the purchasing department, one for the inspector, to notify him that his goods are in, and one in the receiving clerk's copy. The best way to make these is by using some form of stamper or register. This keeps and delivers all copies in good shape, and removes the bother of loose carbons.

The other form required by the receiving clerk is the inspection tag. This is an ordinarily running tag with spaces for entering the date of receipt, purchase order number, department or person receiving the goods, and signatures of the receiving clerk, the inspector, and one to whom the goods are delivered. This tag is made out at the same time as the receiving slip is attached to the material, and remains on it until it is finally used on the job, or is put in stock. If the material is of such a nature as to require inspection before acceptance, the inspector places his initials on the tag or punches it with his private pencil, as an indication that he finds the material acceptable.

Sometimes these tags are made with detachable coupons, or with self-carbonized slips pasted on that may be torn off and turned in by the inspector, or notes that he has passed the goods, or by the one to whom they are delivered, as evidence that he has received them in good condition. In such case, these coupons, or slips, are sent to



Model Hangar of Mr.  
Donald Woodward's  
D. W. Air Service at  
Le Roy, N. Y., designed  
and erected by  
John B. Pike & Son,  
Inc.

## John B. Pike & Son, Inc.

Designers and Builders of  
Airports and Aviation Buildings  
ROCHESTER, N. Y.

NATHANIEL M. RYAN, JR., Architect Engineer

Consult us regarding:

Reinforced  
Concrete  
Drainage

Hangars  
Buildings  
Cost Estimates

## PlaneTalk

—Test his  
plane, attached  
to every Travel  
Air Slip, are  
filled and sent  
returned to the  
owner on an  
envelope of date  
return.

### FLIGHT RECORD

From Wichita to **San Diego, Pa.**  
Left Wichita Mo. 5:20 am-7:20  
Arrived **San Diego, Pa.** 5:20 am-7:20  
Time **2:00** - **2:00** - **2:00**  
Flying time - **2:00** - **2:00**  
Average speed - **73.3**  
Amount of fuel used - **10.5** gal.  
Amount of oil used - **1.5** gal.  
Engine and motor - **Standard**  
Remarks -  
**Read Winds Sw. Windy at  
any, Heavy Foggy**  
**NOO ALL THE WAY**  
Name **A. L. EMERY, JR.**  
Address **San Diego, Pa.**  
Business **San Diego, Pa.**



## A Winter Flying Suit of Quality

### 3 INCH BELT

Woolen cloth, water-  
proofed lined with sheep-  
skin, 3/4 to 1 1/2 inch  
thick. Ties leather  
fasteners in front and  
wrist, wool duff pants  
in suit. Collar of extra  
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Height, overall	6 ft. 8 in.
Wing span	28 ft.
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Wing area, total	126 sq. ft.
Wing loading	14 lb. per sq. ft.
Engine, total	100 hp.
Engine, each	50 hp.
Propellers	135 sq. ft.
Propeller, each	67.5 sq. ft.
Weight empty	990 lb. (approx.)
Top load	500 lb.
Disposable load	500 lb.
Gross weight, loaded	1090 lb.
Powerplant, each	Vault 45 hp.
Powerplant, weight	210 lb.
Wing loading	9 lb. per sq. ft.
Power loading	14 lb. per hp. (actual)
High speed	110 mph.
High speed at 8000 ft.	100 mph. (est.)
Cruising speed at 1500 rpm	85 mph.
Landing speed	30 mph.
Takeoff run	390 ft. (soft air)
Landing run	300 ft. (soft air)
Climb at sea level	890 ft. per min.
Ceiling	12,000 ft.
Gustproof construction	4 gal. per hr.
Gustproof capacity	20 gal.
Range	450 mi.
Endurance	5 hr.

## Wanted:—Suitable 1929 Air Tour Formula

(Continued from page 1403)

appointed, headed by a man, who, at that time, was with the Wright Aeronautical Corporation. That man worked with us for a time, but since then he has left the Wright organization, and the so-called advisory committee apparently has ceased to function.

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AVIATION  
November 3, 1935

The deed of gift offering the Eddie B. Ford Reliability Trophy to the winner of the National Air Tour specifies that the contest shall be "free-for-all," provided the plane be capable of a speed in excess of 60 miles an hour, be strictly a conventional airplane, and be manufactured under an Approved Type Certificate issued by the United States Department of Commerce. The Ford trophy can go to but one plane, and it would not be fair, either to Mr. Ford or to the manufacturers to limit that trophy to one class. It might be well enough to secure additional trophies for the various classes, but the original perplexing problem,—that some suitable formula for all classes of planes competing for the Ford trophy—will not be met.

### Multi-Engined Plane Not Mentioned

It is interesting to note that the pilots, in their petition, or in their discussion, failed to bring up the rule regarding multi-engine aircraft. This rule, paragraph 39, in the official rules of the tour, has been in the rules for the past three years and has evolved at least one formal protest from pilots participating in the tour.

It reads as follows:

"An engine of a multi-engine ship will be allowed a lower cubic inch displacement figure than that which actually exists and that meet the formula provided. This can be demonstrated to the satisfaction of the Contest Committee that his plane is capable of performing as follows:

(a)—It will be required that the pilot of a three-engine ship climb from 1,000 ft. altitude to 2,000 ft. altitude as indicated on a calibrated altimeter carried by the contest committee observer as follows: With the center engine dead, he shall climb from 1,000 ft. to 1,400 ft., with the right engine dead he shall climb from 1,400 ft. to 1,700 ft. and with the left engine dead he shall climb from 1,700 ft. to 2,000 ft. If he shall accomplish this to the satisfaction of the Contest Committee observer, he will then be allowed a cubic displacement figure of two-thirds of the actual cubic displacement of all engines."

The second and last clause in paragraph 39 deals with the required performance of dual engine ships. Deed in the rule, it might be explained, means, of course, that the engine sits below the possibility of moving three.

### Only One Formal Protest Concerning Rule

As stated, only one formal protest has been received by the contest committee concerning of that rule. And that protest, mailed in by Eddie Stinson, was received after the 1935 Rules had been printed and distributed, hence too late to do anything about it. Perhaps one reason why other manufacturers of single engine planes have not entered formal protest to that with climbing tests by present-day to monocoque craft was not generally regarded as possible. With the verbal complaints of a number of the pilots in mind the contest committee, some time before the contest tour, discussed the advisability of striking out the rule. The Committee, however, seemed to agree that if any three engine plane could perform to that manner it was entitled to all the credit it could get.

The National Air Tour has unfortunately been a most helpful factor in the development of American conventional construction, but, as Mr. Stinson has pointed out in his article, there is a great need of formula which will place the engine on a more equal and fair basis. Aviation welcomes suggestions as to a formula, or some sort of arrangement, whereby such may be accomplished, and thus add to the value of America's air contest—The Editor.

AVIATION  
November 3, 1935

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"Well, I've had three hours on sandwiches and coffee and got my first hop today on a dirty lunch. Didn't make out so well. Made a bad landing on a girl's nose with an oncletic."

"Too bad about poor old Bill, wasn't it? But in the heavenly day he's making out all right. Oh, didn't you hear. Crashed up bad. The plane hit a lamp and he overthrew one table, delivering a vegetarian dinner to a mere baron."

"Jim certainly is making out well. Heard he made a record for the straightaway most course the other day. Swept the plate away from the passenger before he ever had the potatoes battered. He almost rode an endurance record with this ship-load from the Rounders Convention, but ran out of cracked ice and ginger ale when he had only an hour to go."

\*\*\*

One of the Long Island pilots being a new plane up in some from the other day, for the third time in his flying career. This probably occurred for the story now giving the reason, that during a recent spell of bad flying weather, he overtook a nice string of trees and had a forced landing on a flying field.

\*\*\*

The crowd which watched the flyers take off from Le Bourget this morning cheered as the machine arose gracefully in the air after rolling heavily along the 900 yards run which the plane made in the take off. Just discovered by R. E. L. of Jackson, Miss.

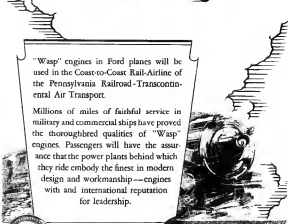
Must have been a few hundred yards of suspense there, when it looked as if the plane wasn't going to get off.

\*\*\*

We assume Mr. Kelley must have bawled  
but had a bit too

"After zooming up to 8,000 ft. with the modest plane, Kelley and he felt the engine suddenly go silent. A sudden pause—and then the machine went into a flat spin. It barely missed a high peak, Kelley said, and headed straight for the middle of the earth for 2,800 ft. Kelley, without a parachute, abandoned the controls and crawled out on the seat of the plane, and, cowboy fashion, braced the landing with his own arms. He slipped back into the cockpit in a hurry, grabbed the controls, shot down a narrow canyon, and made a pancake landing. The plane was wrecked." Just in the San Diego "Union" discovered by R. T. J., of the Aircraft Squadron Fifth Fleet. Unmistakably awarded the prize as This Week's Amazing Aeronautical Event.

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